

Trend Study 10-17-05

Study site name: East Calf Canyon.

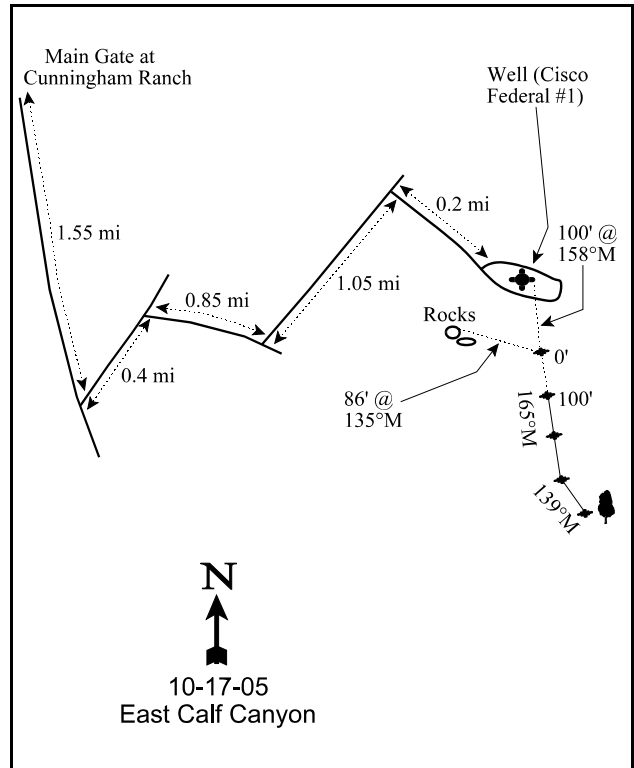
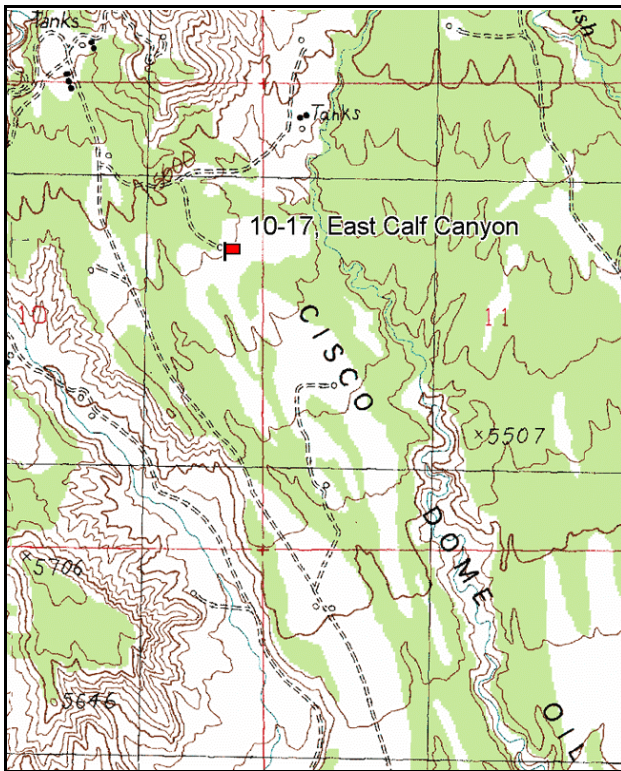
Vegetation type: Wyoming Big Sagebrush.

Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the main gate at Cunningham Ranch go southeast on the main road for 1.55 miles to a fork and turn left (northeast). Proceed 0.4 miles to a fork. Turn right and proceed 0.85 to a fork. Stay left and go 1.05 miles to another fork. Turn right and go 0.2 miles to a well numbered Cisco Federal #1. The first baseline stake is approximately 100 feet southeast of the road in the sagebrush opening.



Map Name: Calf Canyon

Diagrammatic Sketch

Township 20S, Range 21E, Section 10

GPS: NAD 27, UTM 12S 4326704 N, 623276 E

DISCUSSION

East Calf Canyon - Trend Study No. 10-17

The East Calf Canyon transect is located in a sagebrush clearing on a mixed pinyon-juniper-sagebrush bench at the base of the Book Cliffs. The study is located north of Horse Pasture and Nash Wash at an elevation of 5,500 feet with a slight southeastern exposure. This Wyoming big sagebrush type has been an important wintering area for deer. This site is located within the large Cisco Allotment which is grazed from November 1 to May 10 by 3 cattle permittees. Two sheep permittees also use the allotment from December through early May. Prior to 1986, sheep use occurred in the winter months and cattle were present from mid-October to mid-June. A 330-acre chaining project was completed in the fall of 1987 on the area just east and northeast of the study site. The chaining and seeding was an Interagency project coordinated with State Lands, BLM, and DWR. This chaining was done with a light smooth chain to help protect an understory population of decadent cliffrose. Pellet group transect data from 2000 indicated deer use to be moderate with an estimated 29 deer days use/acre (72 ddu/ha). Data from 2005 was estimated at 69 deer days use/acre (170 ddu/ha), 14 elk days use/acre (35 edu/ha), and 1 cow day use/acre (2 cdu/ha). Besides its importance as big game and livestock winter range, there is active oil and gas exploration with associated developments and network of roads in the area. At the north end of the clearing is an oil pump and storage tanks.

Soil on the site is a moderately deep, well-drained, loam to clay loam. Effective rooting depth is estimated at nearly 16 inches. Soils are neutral in reactivity (pH of 7.2). Phosphorus and potassium levels are marginal (Tiedemann and Lopez 2004). Shrub interspaces are mostly bare with small gullies and compacted animal trails showing the effects of some surface erosion. It was estimated in 2000 that the interspaces had between 4-6 inches of soil loss as indicated by the pedestaled shrubs. An erosion condition class assessment rated erosion as stable in 2005, despite high amounts of bare soil.

The overall area supports a complex comprised mostly of juniper-pinyon woodland with scattered sagebrush openings. These sagebrush-grass openings provide the important forage for deer, sheep, and cattle. Wyoming big sagebrush is the key browse species, and according to earlier BLM studies on the allotment in 1986, sagebrush utilization was heavy to severe. Sagebrush density was estimated at 3,999 plants/acre in 1986. After the sampling size was increased in the early 1990's, sagebrush density estimated at 5,600 plants/acre in 1995, 5,880 plants/acre in 2000, and 5,140 plants/acre in 2005. Data collected by the range crew in late June 1986 found a high percentage of decadent plants (55%) and many plants in the heavily hedged form class (57%). Since 1995 decadence has been between 18-31%. Utilization has been moderate in that period of time. Although decadence and the percent of plants classified as dying increased in 2005, young recruitment was high at 32% of the population and nearly 5,000 seedlings/acre were sampled. This site contrasts with the West Horse Pasture (10-16) study less than 2 miles to the south. This site has much less cheatgrass and shows good sagebrush reproduction. In 2005, leader growth averaged 1.9 inches, while West Horse Pasture averaged 1.2 inches because sagebrush has to compete with cheatgrass for moisture. Cover from Wyoming big sagebrush was estimated at 17-19%, and with this level of cover, the herbaceous understory is usually in a suppressed state and will have a difficult time increasing.

The two other browse species found on the transect are broom snakeweed and pricklypear cactus. Utah Juniper surrounds the sagebrush opening and does not appear to be invading. Mature trees, especially on the edges and in the opening, have been highlined. Point-center quarter data estimates were 43 juniper trees/acre in 2000 and 47 trees/acre in 2005. Mean diameter was 2.5 inches in 2000 and 3.8 inches in 2005.

The sagebrush interspaces are basically devoid of vegetation except for annual cheatgrass. Even this invader species grows best under the protection of the sagebrush canopy. In 1995, cheatgrass was present in nearly every quadrat (98%), but was much lower in 2000 and 2005. Bottlebrush squirreltail was most abundant in 1995, but has since declined. It occurs sporadically throughout the site, but mostly under shrub crowns. There

are a few scattered forbs, the most abundant are longleaf phlox and several milkvetch species that occur in low densities. The disturbed areas along the road and drill pad are a refuge for exotic annual weeds such as Russian thistle, but they have not yet invaded into the flat.

1986 APPARENT TREND ASSESSMENT

The sagebrush cannot sustain current levels of use for many more years and there does not appear to be enough young plants to maintain stand density. A drought or severe winter could be deleterious. Soil trend appears downward because of the lack of ground cover, subsequent loss of the sandy soil through gully and surface erosion and lack of establishment of perennial plants in the bare areas. A combination of reduced grazing pressure and a sagebrush reduction treatment would be helpful in rejuvenating this area.

1995 TREND ASSESSMENT

Due to the recovery of the Wyoming sagebrush population from many years of excessive grazing, the browse trend is slightly upward. Although the Wyoming big sagebrush appears to be adequately recovering from heavy grazing pressure, the density of sagebrush coupled with the extended drought is causing the herbaceous understory to be stunted and to have poor diversity. The broom snakeweed population appears to be slightly increasing and the age class structure indicates a mature population with many young and seedlings present. This slight increase could be due to the much larger sample size and better distribution of the sample used throughout the sagebrush opening. The herbaceous understory is in poor condition with very few perennial species present. Sum of nested frequency for bottlebrush squirreltail and longleaf phlox significantly increased since 1986, but do not provide much forage or cover on this site. Cheatgrass is very abundant and dominates the site, which is a fire hazard. The herbaceous understory trend is stable, but with poor composition. The interspaces have little protection from erosion and some pedestaling is evident, but it does not appear to be any different than in 1986. Most litter and herbaceous vegetation is associated with the sagebrush plants, leaving the interspaces bare of cover. Trend for soil is stable for now. Thinning the sagebrush population on this site would benefit the herbaceous understory as well as provide needed soil protection. The Desirable Components Index score is fair due to good browse cover, good young recruitment, and moderate annual grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - slightly up (+1)

herbaceous understory - stable (0)

winter range condition (DC Index) - fair (36) Lower potential scale

2000 TREND ASSESSMENT

Trend for soil is slightly down to a large increase in bare soil, decreases in vegetation and litter cover, and a decrease in sum of nested frequency for perennial herbaceous species. The ratio of protective ground cover to bare soil also largely decreased due to these factors. Trend for browse is stable. Wyoming big sagebrush slightly increased in percent decadence and heavy use in 2000, but is still well below the 1986 levels of 55% and 57%, respectively. Recruitment from young plants is currently high at 24% and adequate to replace the dying individuals that may be lost. The sagebrush is very dense at this site, and some thinning out of the population would be positive. Sum of nested frequency of the herbaceous perennial component decreased in 2000 from an already low level, but on the positive side cheatgrass significantly declined. The herbaceous understory will remain in this suppressed condition and poor composition unless the sagebrush is thinned out. Trend for the herbaceous understory is slightly down and in poor condition. The DCI score improved with the reduction of cheatgrass.

TREND ASSESSMENT

soil - slightly down (-1)

browse - stable (0)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - good (49) Lower potential scale

2005 TREND ASSESSMENT

The soil trend is stable. Conditions were very similar to 2000. Vegetation was slightly higher and litter slightly lower than in 2000. The browse trend is slightly down. Sagebrush has been negatively effected by drought as decadence and the number of dying plants increased, but recruitment of young plants and number of seedlings were been excellent. However, sagebrush density decreased 13% from 5,880 plants/acre to 5,140 in 2005. This decrease was primarily in the mature age class of the population. Broom snakeweed density was unchanged since 2000. The herbaceous understory trend is slightly down. Sum of nested frequency for perennial species decreased about 25%. Annuals increased in 2005 with the wet spring weather, but cheatgrass did not increase significantly. The DCI score improved with the increase in young individuals.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - good (51) Lower potential scale

HERBACEOUS TRENDS --

Management unit 10 , Study no: 17

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
G	Bromus tectorum (a)	-	_b 359	_a 95	_a 116	16.90	1.02	.95
G	Hilaria jamesii	3	-	-	-	-	-	-
G	Poa fendleriana	-	3	1	-	.00	.00	-
G	Sitanion hystrix	_a 31	_b 95	_{ab} 58	_a 38	.66	.41	.90
G	Vulpia octoflora (a)	-	_b 37	_a 1	_c 87	.07	.00	.84
Total for Annual Grasses		0	396	96	203	16.97	1.02	1.79
Total for Perennial Grasses		34	98	59	38	0.66	0.41	0.90
Total for Grasses		34	494	155	241	17.63	1.44	2.70
F	Astragalus convallarius	-	-	6	-	.00	.19	.00
F	Astragalus sp.	1	8	1	11	.36	.00	1.50
F	Castilleja linariaefolia	-	6	3	2	.06	.03	.00
F	Calochortus nuttallii	2	-	-	5	-	-	.01
F	Chenopodium fremontii (a)	-	-	-	10	-	-	.54
F	Chenopodium leptophyllum(a)	-	3	-	-	.00	-	-
F	Chaenactis stevioides	-	-	-	3	-	-	.01
F	Descurainia pinnata (a)	-	_a 8	_a -	_b 94	.01	-	.83

Type	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
F	Draba sp. (a)	-	_a 18	_a 2	_b 57	.03	.00	.80
F	Eriogonum cernuum (a)	-	-	-	6	-	-	.02
F	Eriogonum sp.	-	2	-	-	.00	-	-
F	Erigeron pumilus	-	-	1	3	-	.00	.04
F	Erigeron utahensis	1	8	-	-	.06	-	-
F	Gilia hutchinifolia (a)	-	_b 17	_a -	_c 199	.04	-	2.35
F	Lappula occidentalis (a)	-	_a 8	_a -	_b 125	.02	-	1.51
F	Lepidium sp. (a)	-	-	-	2	-	-	.03
F	Oenothera sp.	-	-	-	7	-	-	.02
F	Phlox longifolia	_{ab} 39	_b 60	_{ab} 41	_a 19	.17	.13	.16
F	Plantago patagonica (a)	-	_b 18	_a -	_c 43	.03	-	.45
F	Salsola iberica (a)	-	_a -	_b 29	_b 17	-	.06	.03
F	Schoenocrambe linifolia	-	4	6	-	.01	.04	.03
F	Sisymbrium altissimum (a)	-	-	-	6	-	-	.03
Total for Annual Forbs		0	72	31	559	0.15	0.06	6.62
Total for Perennial Forbs		43	88	58	50	0.67	0.40	1.78
Total for Forbs		43	160	89	609	0.82	0.46	8.41

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 10 , Study no: 17

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Artemisia nova	0	0	0	-	.15	-
B	Artemisia tridentata wyomingensis	91	97	87	17.57	19.38	17.38
B	Atriplex canescens	0	0	0	-	.38	-
B	Gutierrezia sarothrae	60	23	34	1.05	.21	1.92
B	Juniperus osteosperma	0	2	3	1.85	.03	1.56
B	Opuntia sp.	5	9	9	.30	.18	.33
Total for Browse		156	131	133	20.77	20.33	21.21

CANOPY COVER, LINE INTERCEPT --

Management unit 10 , Study no: 17

Species	Percent Cover	
	'00	'05
Artemisia tridentata wyomingensis	-	22.98
Gutierrezia sarothrae	-	3.40
Juniperus osteosperma	3.40	3.63
Opuntia sp.	-	.60

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10 , Study no: 17

Species	Average leader growth (in)
	'05
Artemisia tridentata wyomingensis	1.9

POINT-QUARTER TREE DATA --

Management unit 10 , Study no: 17

Species	Trees per Acre	
	'00	'05
Juniperus osteosperma	43	47

Average diameter (in)	
'00	'05
2.5	3.8

BASIC COVER --

Management unit 10 , Study no: 17

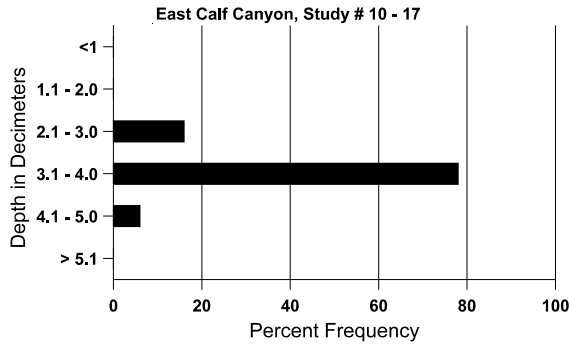
Cover Type	Average Cover %			
	'86	'95	'00	'05
Vegetation	5.50	37.69	23.30	30.57
Rock	.25	.27	.69	.45
Pavement	.25	.17	.43	.33
Litter	47.00	38.50	33.78	22.35
Cryptogams	2.50	7.52	9.76	8.75
Bare Ground	44.50	29.38	47.86	47.38

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 17, Study Name: East Calf Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
15.7	62.0 (13.6)	7.2	44.0	29.4	26.6	0.8	6.6	67.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 10 , Study no: 17

Type	Quadrat Frequency		
	'95	'00	'05
Sheep	9	-	-
Rabbit	16	19	42
Elk	-	-	1
Deer	21	30	50

Days use per acre (ha)	
'00	'05
-	-
-	-
-	14 (170)
29 (72)	1 (2)

BROWSE CHARACTERISTICS --

Management unit 10 , Study no: 17

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>												
86	3999	1266	466	1333	2200	-	2	57	55	-	10	12/18
95	5600	700	1140	3480	980	300	74	4	18	4	4	20/33
00	5880	140	1420	3000	1460	440	38	22	25	8	9	18/30
05	5140	4940	1640	1900	1600	1440	28	27	31	19	20	22/32
<i>Gutierrezia sarothrae</i>												
86	1932	533	400	1266	266	-	0	0	14	-	0	9/7
95	4940	540	1980	2960	-	80	.80	0	0	-	0	9/9
00	1000	60	20	900	80	220	0	0	8	4	4	5/6
05	1140	1060	120	1020	-	-	0	0	0	-	0	14/19
<i>Juniperus osteosperma</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	40	20	20	20	-	-	0	0	-	-	0	-/-
05	60	-	60	-	-	-	0	0	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Opuntia sp.												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
95	100	-	-	100	-	-	0	0	0	-	0	6/19
00	240	-	-	240	-	-	0	0	0	-	0	4/19
05	200	-	-	180	20	20	0	0	10	-	0	7/32
Sclerocactus sp.												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	3/5